

WHAT IS CLAIMED IS:

1. An imaging apparatus for photographing a subject, comprising:

an image pickup device for receiving light rays transmitted from the photographic subject, a photographic subject image being formed on the image pickup device, and the image being converted to an original image signal;

designating means for designating one of a first gradation mode and a second gradation mode;

converting means for converting the original image signal from said image pickup device to an output image signal in accordance with the designated mode, said output image signal having a first gradation in the designation of the first gradation mode, and a second gradation in the designation of the second gradation mode; and

adjusting means for adjusting a level of the original image signal inputted to said converting means in accordance with the designated mode, and maintaining an average level of the output image signal outputted from said converting means at a substantially constant level even in the designation of said first and second gradation modes.

2. The apparatus according to claim 1, wherein said adjusting means comprises:

amplifying means for amplifying the original image

signal outputted from said image pickup device with one of adjustable gains; and

setting means for setting the one of gains in accordance with the designated mode.

5 3. The apparatus according to claim 1, wherein said adjusting means comprises:

10 controlling means for controlling an exposure amount of the photographic subject image formed on said image pickup device in accordance with the designated mode.

4. The apparatus according to claim 3, further comprising setting means for setting one of first and second exposure control target values in accordance with the designated mode.

15 5. The apparatus according to claim 3, wherein said controlling means comprises:

20 means for analyzing the output image signal outputted from said gradation converting means, calculating a photometric value for exposure control, and setting one of first and second exposure control target values in accordance with the photometric value and the designated mode.

25 6. The apparatus according to claim 1, wherein said designating means designates one of the first and second gradation modes and a third gradation mode,

said converting means converts the original image signal to the output image signal having a third

gradation in the designation of the third gradation mode, and

said adjusting means maintains an average level of the output image signal outputted from said converting means at a substantially constant level even in the designation of said first, second and third gradation modes.

7. The apparatus according to claim 1, wherein said converting means converts the original image signal to the output image signal in accordance with a first gradation property curve for defining the first gradation and a second gradation property curve for defining the second gradation.

8. The apparatus according to claim 7, wherein said first and second gradation property curves intersect each other at a certain target value, and the target value substantially corresponds to an average output level of the output image signal.

9. The apparatus according to claim 7, wherein said first and second gradation property curves are applied to a relation of the output image signal in a predetermined level range with respect to an input of the original image signal.

10. An imaging apparatus for photographing a photographic subject, comprising:

an image pickup device for receiving light rays transferred from the subject, a photographic subject

image being formed on the image pickup device, and the image being converted to an original image signal;

designating means for designating one of first and second gradation modes;

5 converting means for converting the original image signal from said image pickup device to an output image signal in accordance with the designated mode, said output image signal having a first gradation in accordance with a first gradation curve in the
10 designation of the first gradation mode, and a second gradation in accordance with a second gradation curve in the designation of the second gradation mode; and

 adjusting means for adjusting a level of the original image signal inputted to said converting means
15 in accordance with the designated mode, and maintaining an average level of the output image signal outputted from said converting means at a substantially constant level;

 wherein said first and second gradation property
20 curves intersect each other at a certain target value, and the target value substantially corresponds to the average output level of the output image signal.

11. The apparatus according to claim 10, wherein the intersection of said property curves is determined
25 to correspond to 18 to 20% of a maximum signal level in a value on an input side of a gradation converting property.

12. The apparatus according to claim 10, wherein
at least one of said first and second gradation
property curves has a knee property in which a knee
point is set in a region having a signal value larger
5 than the signal value of the intersection of said
property curves.

13. An imaging apparatus for photographing a
photographic subject, comprising:

an image pickup device for receiving light rays
10 transferred from the subject, a photographic subject
image being formed on the image pickup device, and the
image being converted to an original image signal;

designating means for designating one of first,
second and third gradation modes; and

15 converting means for converting the original image
signal from said image pickup device to an output image
signal in accordance with the designated mode, said
output image signal having a first gradation in
accordance with a first gradation curve in the
20 designation of the first gradation mode, a second
gradation in accordance with a second gradation curve
in the designation of the second gradation mode, and a
third gradation in accordance with a third gradation
curve in the designation of the third gradation mode;

25 wherein said first, second and third gradation
property curves intersect one another at a
substantially same point.

14. The apparatus according to claim 13, wherein
an intersection of said property curves is determined
to correspond to 18 to 20% of a maximum signal level in
a value on an input side of a gradation converting
property.

15. The apparatus according to claim 13, wherein
at least one of said first, second, and third gradation
property curves has a knee property in which a knee
point is set in a region having a signal value larger
than the signal value of the intersection of said
property curves.

16. An imaging method of photographing a subject,
comprising:

an image pickup step of receiving light rays
transmitted from the photographic subject, a
photographic subject image being formed, and the image
being converted to an original image signal;

designating step of designating one of a first
gradation mode and a second gradation mode;

converting step of converting the original image
signal to an output image signal in accordance with the
designated mode, said output image signal having a
first gradation in the designation of the first
gradation mode, and a second gradation in the
designation of the second gradation mode; and

adjusting step of adjusting a level of the
original image signal in said converting step in

accordance with the designated mode, and maintaining an average level of the output image signal in said converting step at a substantially constant level even in the designation of said first and second gradation modes.

17. The imaging method according to claim 16, wherein said adjusting step comprises:

controlling step of controlling an exposure amount of the photographic subject image in accordance with the designated mode.

18. The imaging method according to claim 16, wherein in said converting step, the original image signal is converted to the output image signal in accordance with a first gradation property curve for defining the first gradation and a second gradation property curve for defining the second gradation.

19. The imaging method according to claim 18, wherein said first and second gradation property curves intersect each other at a certain target value, and the target value substantially corresponds to an average output level of the output image signal.

20. An imaging method for photographing a photographic subject, comprising:

an imaging step of receiving light rays from the photographic subject, forming a photographic subject image, and converting the image to an original image signal;

a designating step of designating one of a first gradation mode and a second gradation mode;

5 a converting step of converting said original image signal to an output image signal in accordance with the designation of one mode in the designating step, said output image signal having a first gradation in accordance with a first gradation curve in the designation of the first gradation mode, and a second gradation in accordance with a third gradation curve in the designation of the second gradation mode; and

10 an adjusting step of adjusting a level of the original image signal inputted to said converting step in accordance with the designation of one mode by said designating step, and maintaining an average level of the output image signal outputted from said converting step at a substantially constant level;

15 wherein said first and second gradation property curves intersect each other at a certain target value, and the target value substantially corresponds to the average output level of the output image signal.

20 21. The imaging method according to claim 20, wherein the intersection of said property curves is determined to correspond to 18 to 20% of a maximum signal level in a value on an input side of a gradation converting property.

25 22. The imaging method according to claim 20, wherein at least one of said first and second gradation

property curves has a knee property in which a knee point is set in a region having a signal value larger than the signal value of the intersection of said property curves.

5 23. An imaging method for photographing a photographic subject, comprising:

an imaging step of receiving light rays from the photographic subject, forming a photographic subject image, and converting the image to an original image
10 signal;

a designating step of designating one of a first, second and third gradation modes; and

a converting step of converting said original image signal to an output image signal in accordance
15 with the designation of one mode in the designating step, said output image signal having a first gradation in accordance with a first gradation curve in the designation of the first gradation mode, a second gradation in accordance with a second gradation curve
20 in the designation of the second gradation mode, and a third gradation in accordance with a third gradation curve in the designation of the third gradation mode;

wherein said first, second and third gradation property curves intersect one another at a
25 substantially same point.

24. The imaging method according to claim 23, wherein an intersection of said property curves is

determined to correspond to 18 to 20% of a maximum signal level in a value on an input side of a gradation converting property.

25. The imaging method according to claim 23,
5 wherein at least one of said first, second, and third gradation property curves has a knee property in which a knee point is set in a region having a signal value larger than the signal value of the intersection of said property curves.

10 26. An imaging apparatus, comprising:

image pickup device including a plurality of pixel elements arranged in a matrix arrays and a charge transfer path of interline type, a image of the subject being formed on said image pickup device and
15 change being generated in the pixel elements;

driving means for driving said image pickup device to readout the pixels as a image signal from said image pickup device, said driving means setting a addition mode in which the pixels are added and the added pixels
20 are readout as the image signal;

analogue to digital converter for quantizing the image signal to output a quantized image signal; and

quantizing level setting means for setting a maximum quantizing level in the analogue to digital
25 converter, which is changed in accordance with the addition number of the pixels.

27. The imaging apparatus according to claim 26,

further comprising controlling means for controlling an exposure of the image on said image pickup device, said controlling means setting a target value of the exposure, and wherein said quantizing level setting means set a maximum quantizing level in accordance of the target value of the exposure in addition to the addition number of the pixels.

28. The imaging apparatus according to claim 26, further comprising an amplifier, connected to said horizontal transfer line, for amplifying the imaging signal, and wherein said charge transfer path of interline type includes a plurality of vertical transfer lines which are arranged along the arrays of the pixel elements in a vertical direction, respectively, and a horizontal transfer line arranged at one side of the vertical transfer lines in a lateral direction, said driving means causing said image pickup device so as to add the adjacent pixels generated from the vertical transfer lines in the horizontal transfer line, and the adjacent pixels transferred from the horizontal transfer line are added in said amplifier.